Responses of Thai Economy to The External Economic Shocks

Thailand Development Research Institute Foundation

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May 1991

THAILAND DEVELOPMENT
RESEARCH INSTITUTE

ACKNOWLEDGEMENTS

The results of the estimation are based on the macroeconometric model constructed by Dr. Bhanupong Nidhiprabha, Dr. Damkirng Sawamiphakdi and Mr. Chanin Kamheangpatiyooth. We also wish to express our sincere appreciation to Mr. Nipat Somjitt, Mr. Theerapol Jumpapech and Mr. Narin Kajai for their helpful and resourceful research assistance.

CONTENTS

LIST OF TABLES AND FIGURE

1. INTRODUCTION

The analysis of the macroeconomic effects of adjustment programs during the period of international disturbances has become increasingly important for developing countries. The general macro policy prescriptions may not be applicable to all countries, due to different economic and socio-political structures. Some country specific policy recommendations are required. Policy makers have to take into account the timing of policy implementation and they have to anticipate various responses from different economic sectors. Modelling of key macroeconomic behaviors are thus warranted.

This paper discusses the macroeconomic linkages of the Thai economy by constructing a small macroeconometric model. The economy is dichotomized into real and financial sectors. Within the real sector, an elaboration in the specification of international trade sector, an elaboration in the specification of international trade sector is made in order to explicitly examine the links between domestic and foreign sectors. The interactions among domestic output, import demand, and export supply are the key relationships in the real sector. The domestic price level is determined by factor affecting aggregate demand and aggregate supply.

In the financial system, portfolio allocations of private sector and banking sector are interrelated since deposits from the private sector are financial constraints of the banking

sector. Nevertheless, commercial banks can relax this financial constraint through foreign borrowing. Therefore, a change in interest rate differentials will lead to adjustments in domestic portfolio and subsequently the balance of payments.

The real and financial sectors are not independent from each other. While the output from the financial sector provides liquidity and working capital for real sector, the output from the real sector becomes an input in the financial sector, since the demand for financial assets depends on income level. The change in domestic price levels determined within the real sector also affects the relative attractiveness of financial assets in the private portfolio. Moreover, the change in domestic price levels relative to foreign price levels will lead to international capital movements.

In the following section, we present a macroeconometric model of Thailand. The model is built as a means to understand the macroeconomic linkages within the Thai economy. After the estimation results are presented, the validation of the model by historical simulation is performed. The results are reported in section 3.

In section 4, simulation exercises are conducted to examine the impact or permanent fall in U.S. government spending, the permanent monetary contraction in OECD, and the temporary oil price shock. Concluding remarks are contained in the last section of the paper.

2. A MACROECONOMIC MODEL AND ESTIMATION RESULTS

To emphasize the importance of the linkages between the domestic and external sectors, we focus on the specification of the trade sector. The size of the model is determined by the number of questions we would like to ask from the model. The model is compact so that is can be manageable and transparent. The linkages between the real and financial sectors are emphasized by detailed specification of the portfolio allocation of the private and banking sectors.

The model consists of 46 equations, 28 of which are behavioral and 18 of which are identities. The complete model specification is shown in Table 1. The list of endogenous and exogenous variables in the model are shown Tables 2 and 3. Furthermore, the interrelationships among variables in the model are illustrated by the flow diagram in Figure 1.

The simulations relationships among variables in the real sector are demonstrated through the national income identity, where income level comprises of private and public spending. In turn, under the hypothesis that private aggregate spending depends on permanent income, thus income level also affects private spending level simultaneously. The interlink between the real sector and the monetary sector is made via the credit availability effect in the consumption and investment functions and via the income effect and the investment effect on the demand for financial assets and the demand for loans, respectively. For the price level, it is determined by external

Table 1

Specifications of the Macroeconometric Model for Thailand

Trade block:

```
(1)  Xa   =  f( [Pxa(1-txa)*e](-1), Pda, Qa+Qp, LHSV(-1) )
(2)  Xi   =  f( e*Pfi/Pdi, [Qi/Y](-1), LHSV(-1) )
(3)  Xs   =  f( Yw*e, LHSV(-1) )
(4)  Ma   =  f( Pma(1+ta)*e, Pda, Y/Y*, Y* )
(5)  Mi   =  f( Pmi(1+ti)*e, Pdi, Y/Y*, Y* )
(6)  Mo   =  f( Pmo(1+to)*e/Pdo, Y/Y*, Y* )
(7)  Ms   =  f( X+M, D7384, D7980 )
```

Aggregate demand and supply:

```
(8)  Qa   =  f( Ka, Na, Mo )
(9)  Qi   =  f( Ki, Ni, Mo )
(10) Cp   =  f( Y-(T/Pd), L, LHSV(-1) )
(11) Ip   =  f( Kp(-1), Y, (CAp-CAp(-1)+L-L(-1)+F)/Pd )
(12) T    =  f( M, A, LHSV(-1) )
```

Price Block:

```
(13) Pd   =  f( PM, Pxa, M1(-1), E )
(14) Pda  =  f( Pd )
(15) Pdi  =  f( Pd )
(16) Pc   =  f( Pd )
(17) PM   =  f( Pma(1+ta)*e, Pmi(1+ti)*e, Pmo(1+to)*e )
```

Financial Block:

Interest Rate and Capital Flows:

```
(18) Rd   =  f( L, Rf, Ip(-1), LHSV(-1) )
(19) F    =  f( Rd, Rf, e, Pfi/Pdi, Qw, D8889 )
```

Private Portfolio:

```
(20) Z/Y*Pd    =  f( Rz, Pd/Pd(-1), LHSV(-1) )
(21) DD/Y*Pd   =  f( Rz, Pd/Pd(-1), LHSV(-1) )
(22) SD/Z      =  f( Rt, Rs, Rg, LHSV(-1) )
(23) TD/Z      =  f( Rt, Rs, Rg, LHSV(-1) )
```

Bank Portfolio:

```
(24) Fl   =  f( D, L, Rf, Rdis )
(25) L    =  f( D, Rd, Fl )
(26) GBb  =  f( D, Rd )
(27) Fa   =  f( D, Ru-Rd )
(28) CAb  =  f( D )
```

Identities:

(29) B = Hb + Hg + Hf + Ho
(30) D = DD + TD + SD
(31) CAp = B - CAb - OB
(32) GBp = Z - TD - SD
(33) Hb = L + GBb + Fa + CAb - D - Fl - OL
(34) X = Xa + Xi
(35) XN = (Xa * Pxa) + (Xi * Pxi)
(36) M = Ma + Mi + Mo
(37) MN = (Ma * Pma) + (Mi * Pmi) + (Mo * Pmo)
(38) TBD = MN - XN + OTBD
(39) CAD = TBD + Ms - Xs - Tr
(40) Hf = CAD + F + OHf + Hf(-1)
(41) A = Cp + Ip + (Cg / Pd) + (Ig / Pd)
(42) Y = A + X + (Xs / Pxs) - M - (Ms / Pms) + Dis
(43) E = (A + (XN / Pd)) - (Qa + Qi + Qp)
(44) Dg = Cg + Ig - T
(45) Bf = Dg - (Hg-Hg(-1)) - (GBb-GBb(-1)) - (GBp-GBp(-1)) - GSB + OG + Bf(-1)
(46) M1 = CAp + DD
(47) Pdh = exp[{ln(Pd)-a1*ln(Pda)-a2*ln(Pdi)}/(1-a1-a2)]

Table 2

List of Endogenous Variables in the Macroeconometric Model for Thailand

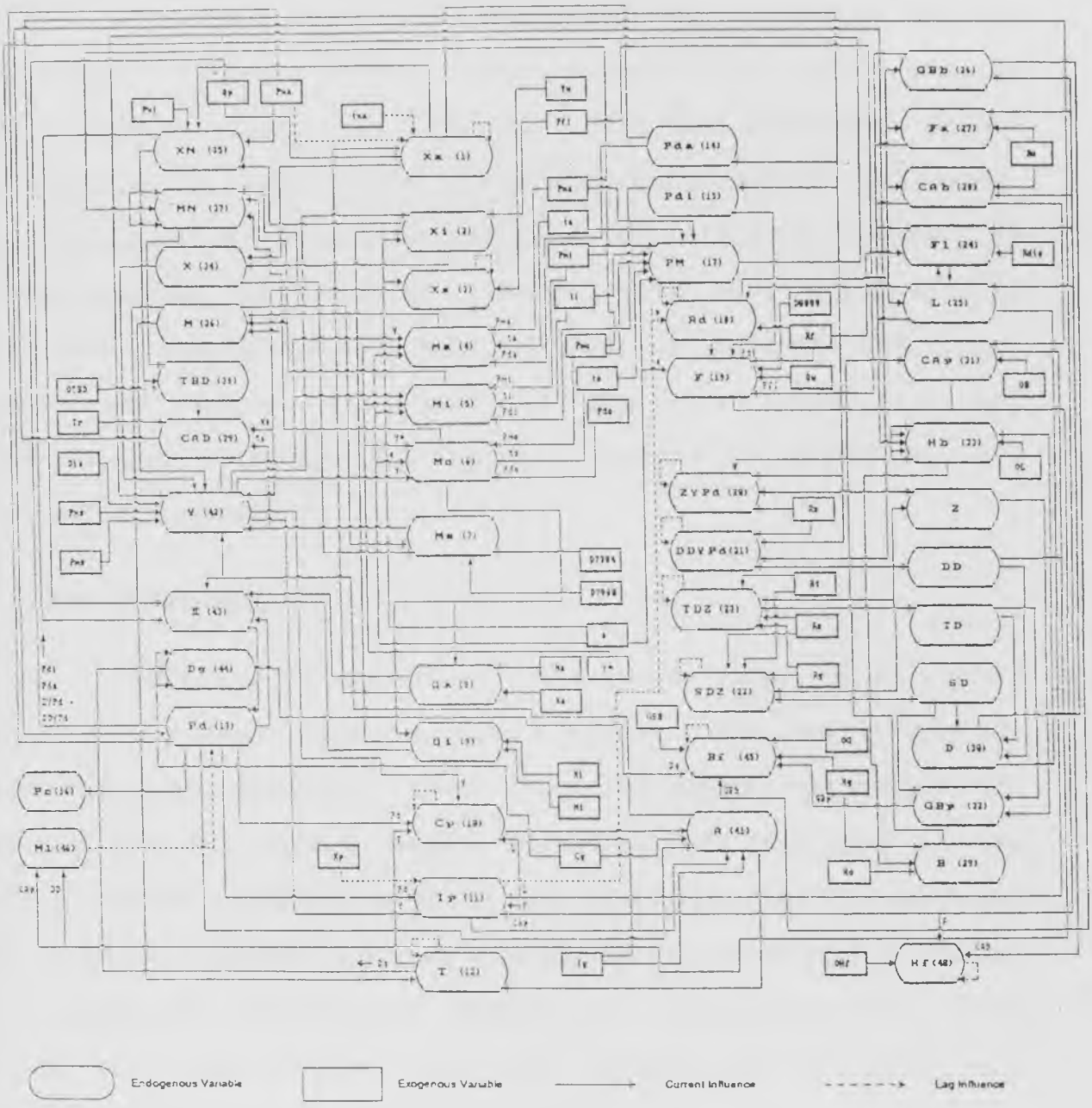
A	=	domestic absorption
B	=	monetary base
Bf	=	stock of government's external debt
CAb	=	cash and claim on BOT by commercial banks
CAD	=	current account deficits
CAp	=	notes in circulation
Cp	=	private consumption expenditures (real)
D	=	total deposits
DD	=	demand deposits
Dg	=	deficits in government budget
E	=	demand pressure variable
F	=	foreign capital inflows
Fa	=	foreign assets
Fl	=	foreign liabilities
GBb	=	government bonds held by commercial banks
GBp	=	government bonds held by private sector
Hb	=	claims on commercial banks by the Bank of Thailand
Hf	=	net foreign assets of the Bank of Thailand
Ip	=	private capital formation expenditures (real)
L	=	commercial bank credits
M	=	aggregate merchandise imports (real)
Ma	=	import value of agricultural products (real)
Mi	=	import value of industrial products (real)
MN	=	aggregate merchandise imports
Mo	=	import value of petroleum products (real)
Ms	=	non-merchandised imports (real)
M1	=	money supply (narrow definition)
Pc	=	consumer price index
Pd	=	GDP deflator
Pda	=	domestic price of agricultural products
Pdh	=	domestic price of public utilities and services
Pdi	=	domestic price of industrial products
PM	=	aggregate import price index
Qa	=	value added of agricultural products
Qi	=	value added of industrial products
Rd	=	interest rate on commercial bank credit
SD	=	saving deposits
T	=	government tax revenues
TBD	=	trade deficits
TD	=	time deposits
X	=	aggregate merchandise exports (real)
Xa	=	export value of agricultural products (real)
Xi	=	export value of industrial products (real)
XN	=	aggregate merchandise exports
Xs	=	non-merchandised exports (real)
Y	=	gross domestic product (real)
Z	=	interest-yielding financial assets in private sector

Table 3

List of Exogenous Variables:
in the
Macroeconometric Model for Thailand

Cg	=	public consumption expenditures (real)
D7384	=	dummy variable (1 for 1973 and 1984, 0 for the otherwise
D7980	=	dummy variable (1 for 1979 and 1980, 0 for the otherwise
D8889	=	dummy variable (1 for 1988 and 1989, 0 for the otherwise
Dis	=	discrepancies in national income identity (real)
e	=	effective exchange rate index
GSB	=	government's borrowing from Government Saving Bank
Hg	=	claims on government by the Bank of Thailand
Ho	=	other components of monetary base
Ig	=	public capital formation (real)
Ka	=	capital stock in agricultural sector (real)
Ki	=	capital stock in industrial sector (real)
Kp	=	private capital stock (real)
Na	=	number of labor employed in agricultural sector
Ni	=	number of labor employed in industrial sector
OB	=	other uses of base
OG	=	other financing of government deficits
OHf	=	adjustment for net foreign assets
OL	=	other liabilities of commercial banks
OTBD	=	other net imports
Pdo	=	domestic price index of petroleum products
Pfi	=	export price index of industrial countries
Pma	=	import price index of agricultural products
Pmi	=	import price index of industrial products
Pmo	=	import price index of petroleum products
Pms	=	import price index of other import products
Pxa	=	export price index of agricultural products
Pxs	=	export price index of other export products
Qp	=	value added of public utilities
Qw	=	industrial production index (for 19 industrial countries
Rdis	=	discount rate
Rf	=	foreign interest rate (Eurodollar rate)
Rg	=	government bond rate
Rs	=	interest rate of saving deposits
Rt	=	interest rate of time deposits
Ru	=	interest rate on US's government bonds (mid-term)
Rz	=	interest rate on interest-yeild financial assets in priv
ta	=	tariff rate of agricultural products
ti	=	tariff rate of industrial products
to	=	tariff rate of petroleum products
Tr	=	unrequited transfer from abroad
txa	=	export tax rate of agricultural products
Y*	=	income trend (real)
Yw	=	world import trend (real)

Figure 1
Flow diagram of the Macroeconometric Model for Thailand



influences, the money supply and the excess demand conditions in the domestic market.

The real sector of the model was estimated by the instrumental variable method. For the private portfolio and the bank portfolio blocks, the seemingly unrelated regression method was employed to improve the efficiency of parameter estimates. The Cochran-Orcutt iterative technique was utilized whenever an autocorrelation was detected. Annual data were employed from 1970-1989. Sources of data were the National Economic and Social Development Board, the Bank of Thailand and the IMF International Financial Statistics. Results of Estimation are provided in Appendix.

The Trade Sector

Thailand is considered as a price taker in the world market. On both imports and exports, the small country assumption was adopted. Thus, only the demand equations for imports and the export supply equations are included in the model. Export commodities which are separated into agricultural and industrial products are determined by the world price levels. The demand for merchandise imports are classified into three categories: agricultural products, industrial products, and petroleum products.

The quantity of agricultural exports supplied depends on its previous year's net price reflecting the lag adjustment pattern of agricultural production. Nevertheless, the current

domestic price of agricultural products is also included, indicating the possibility for exporters to choose between supplying to foreign or domestic markets. The substitution is made, not between supplying to export markets and non-tradable sector, but between supplying to export markets and domestic market. Therefore, the real exchange rate, or the relative price of exportables to non-tradable prices are not relevant in this equation, since we are disaggregating exportables in different categories of exports. The effective exchange rate should then be employed, since it affects the decision whether to supply at home or abroad. There are both theoretical and empirical justification for including the effective exchange rate in the exports and import functions.

Furthermore, the homogeneity assumption embodied in the price ratio variables in imports and export equations have long been questioned by various authors [Haynes and Stone (1983), Wilson and Takacs (1979)]. The weakness of this assumption is that it contains the influence of the two price variables to be equal in magnitude but opposite in sign (Murray and Ginman, 1976). In the study of import demand and export demand functions of 19 industrial countries, Warner and Krenin (1983) found that it is not justified to employ a composite relative price variable; separation into its components more accurate results. Since import and export unit value indexes and domestic wholesale price index are constructed with different weights, and usually different formulas, the homogeneity constraint would be inappropriate in practice. In this paper, we choose to test the

propriety of the homogeneity constraint by separating the composite relative prices.

The quantity of agricultural exports supplied varies in the opposite direction of the change in the current domestic price level of agricultural products. Furthermore, the one year lag of the quantity of agricultural exports supplied is also included as an explanatory variable to capture disequilibrium quantity adjustment.

The share of agricultural products in GDP was first introduced in the agricultural exports supply equation to capture the output capacity, but the negative correlation was observed. The reason comes from the changing structure of the Thai economy. While the share of agricultural products in GDP is declining as Thailand approaches a NIC status, the export values of agricultural products are still increasing.

Instead, the agricultural export production capacity in this sector is represented by the aggregate valued added of agricultural products and public utilities. While the former is endogenously determined from the production function in the model, the latter is an exogenous variable.

Unlike the agricultural exports supply equation, the one year lag production capacity is represented by the share of industrial products in GDP. It should be noted that the high value of the estimated coefficient of the share of industrial product variable suggests the the changing structure of the

economy cause a massive contribution to the rapid growth of industrial exports.

The movement of the current account is captured by endogenizing the exports and imports of services. Since the main component of export services is travel receipt, the quantity demanded for export services would depend on real world income (in baht).

Imports of services depend on the total trade volume since freight and insurance expenses tend to grow with the quantity of merchandise imports and exports. Two dummy variables are added into the service imports equation. The first dummy captures the 1973 and 1984 period of a reduction in import services due to tight monetary control. The second dummy capture the positive impact on imports of services due to the oil price chocks in 1979 and 1980.

The specification of the three merchandise demand for imports are quite similar. Induced in the import demand functions are their own price variables (in baht currency) with their corresponding tariff rates, their domestic competing product prices, the real income trend, and the ratio of actual real income to trend real income. The motivation for including the last variable is to capture the impact of the real growth rate on the quantity import demanded (Khan and Rose, 1975). Thus, the income elasticity is not constant, but it is able to vary whenever actual income deviates from the trend income.

The lagged dependent variable was initially included in

the tree merchandise import demand equations to allow disequilibrium adjustments. However, none of them attains a satisfactory level of significance. Thus, this variable is excluded from all merchandise import equations.

The obtained values of the import and domestic price elasticities of import demand for agricultural imports and industrial products are in different magnitudes. It clearly suggests that it is inappropriate to force the homogeneity assumption. Except for the petroleum products, whose domestic and import price indexes are not subject to aggregation problem, it is obvious that the same percentage increase in import price and domestic price of the competing products will lead to a different responsiveness of imports.

All import price elasticities are less than unity, suggesting the difficulty of finding the product substitutes. The import demand for petroleum products is the least elastic. The effects of the oil price shock on the current account will be substantial.

The estimate results show that the elasticity of income trend variable is greater than unity for both agricultural and manufactured imports. It suggests that the quantity demanded for these kinds of imports are sensitive to the trend income growth rate. Furthermore, the coefficients of the ratio of actual income to trend income variable are high, especially in the demand for manufactured imports. The deviation from income trend

elasticities import demand for agricultural, manufactured, and petroleum products are 2.35, 3.42 and 3.37, respectively. As mentioned earlier, it means that there will be a substantial increase in the quantity demanded for imports during economic boom. This finding has a policy implication on the stabilization policy: contractionary policy will be very effective in reducing the current account deficit.

Aggregate Demand and Supply

It has been argued that an appropriate econometric model for developing countries should focus on the supply rather than the Keynesian demand determined model. The first two equations in this block represent the production functions of the economy. The aggregate production is decomposed into two products: agricultural and industrial products. Both equations depend upon the amounts of corresponding capital stocks, the real import values of petroleum products, and the number of labor employed in the corresponding sector. It should be noted that our model explicitly links the international transmission disturbances with domestic supply via the petroleum imported inputs.

On the aggregate demand components, private consumption expenditures depend on real disposable income and consumption of the previous period. The lagged variable reflects either the effect of persistent habit or distributed income lags, according to the permanent income hypothesis. The estimated short-run and long-run income elasticities are 0.32 and 0.89, respectively.

Thus the impact of a change in current income on current consumption is significantly different from the long-run effect. Furthermore, the loan credits is also included in the consumption equation to show the behavior that consumers have alternative to select borrowing instead of using their incomes for spending. The specification of the consumption function still maintains the indirect effects of public deficit since both income and price variables are included.

If the interest rate is controlled, credit rationing is unavoidable. Credit rationing is now regarded as an important part of the transmission mechanism for monetary policy. But credit is likely to be rationed even without interest control or with perfect capital mobility. Stiglitz and Weiss (1981) argued that because the asymmetric information under uncertainly between leaders and borrowers, credit rationing is likely to occur, and the interest rate will not clear the market. In the MIT-PENN-SSRC model, monetary policy affects the credit availability and the volume of investment without necessarily effecting the interest rate. It is argued here that, regardless of the degree of capital mobility, investment is affected by the additional quantity of bank credit as long as the rate of interest does not clear the market. Tobin (1978)) has also emphasized the importance of the credit availability effect of monetary policy.

Private investment behavior is explained by the flexible accelerator hypothesis. The speed of adjustment between the actual and the desired level of capital stock varies according to the size of the additional bank credit relative to

the gap between the desired and actual level of capital stock. The credit availability effect is the important channel linking the real and financial sector in this model. In addition, adjustment of the actual capital stock to the desired level is made faster with the additional amount of domestic money supply and foreign capital inflows. Thus, money financing deficit will affect the domestic investment in a similar manner with the bond financing deficit, if the latter raises domestic rate of interest and induces more capital inflows.

The estimation results from equation (11) indicate that the output elasticity of the demand for capital stock is greater than one, indicating that private investment responds vigorously to the expansion of output.

Government revenue function is estimated in equation (12). It depends on aggregate imports and real domestic absorption through import tariff revenues and indirect taxes. The lagged endogenous variable included in the tax function captures the effect of lag revenue collection.

The Price Block

The approach taken in this block is to model the determination of GDP deflator. After that we can link the GDP deflator with domestic prices of agricultural and industrial products. The identity (47), explaining the domestic price of the remaining sector, i.e., public utilities and services, is imposed to comply with the homogeneity condition.

It is argued here that the inflation rate in Thailand is determined by both internal and external impulses. Inflation is directly related to the demand pressure variable, which is the internal impulse represented by the Okun gap, i.e., the ratio of the level of aggregate demand to the capacity output. In addition, the money supply (M_1) is also included as one of the explanatory variables of the equation to follow the fundamental proposition of the monetarist. External sources of inflation originate from imparted inflation and export demand pressure via agricultural product prices. All estimated coefficients of the explanatory variables give the expected signs.

The domestic price level (GDP deflator) determines domestic agricultural and industrial product prices. It should be rated that the estimated coefficients of the GDP deflator in equations (14) and (15) are not significantly different from unity. This implies that these two prices, including the domestic prices of services and utilities, are determined by identity (47) move proportionately in the long run which is the result of the constant weighting index system. The domestic agricultural and industrial product prices in turn enter the corresponding import demand functions, allowing the substitution effects to take place between domestic and import products. The relationship between the consumers' price index and the GDP deflator is show in equation 16 while the relationship between the aggregate import price index and its three disaggregate components are shown in the last equation of the price block.

The Financial Block

The interest rate and capital flows

There are two behavioral equations in this block the loan demand and the foreign capital inflows. The demand for loan equation and the loan supply equation shown in the bank portfolio sub section simultaneously determine the commercial banks' lending interest rate and the amount of bank credit. The demand for loan depends negatively on the bank lending rate and positively on the foreign interest rate and the lagged private investment.

An increase in the foreign interest rate will lead to a higher demand for domestic credit due to a negative substitution effect. The lagged interest rate level reflects the lagged adjustment of the domestic interest rate to the new equilibrium level.

Net capital inflows, as specified in equation (19) depend on activities at home and abroad: interest rates, the exchange rate, price levels, and foreign income level (proxied by the level of industrial production in developed countries). The theoretical justification of this equation is provided by Neihans (1984). Although, it is not necessarily to have the homogeneity condition for the price level, for this particular equation, the coefficient price ratio did show the stronger level of significance than the coefficients of the absolute price levels. However, by separating the composite price ratio into exchange rate and price ratio allow us to test the appropriateness of the

homogeneity assumption.

Net capital inflows consist of the capital movements via portfolio investments and long-term direct foreign investment. The signs of the estimated coefficients indicate that an increase in the levels of industrial production in industrial countries, domestic interest lending rate, foreign and domestic prices of industrial products will lead to an increase in net capital inflows. On the other hand, net capital inflows are reduced as a result of the increase in the foreign interest rate. However, for a given equal percentage increase in domestic and foreign interest rates, there would be a net foreign capital inflows. That is, foreign capital inflows is more elastic to domestic interest rate than the foreign interest rate. It might be easier to bring the money in them than to take the money out. This suggests that the capital mobility is far from perfect. The domestic interest rate is usually above the foreign interest rate. In addition to country risk and foreign exchange rate risk, the withholding tax on the interests paid to foreign borrowing obstructs the capital mobility. The withholding tax was employed frequently in the past to control capital account. To stimulate capital inflows, the government would temporary abandon the tax rate. To prevent the influx of the capital inflows, the government would reimpose the withholding tax rate. In addition, sterilization of capital inflows were made in order to conduct the monetary policy. Depreciation of the effective exchange rate stimulates excessive foreign borrowing.

The Private Portfolio Block

Portfolio allocations of the private sector can be explained in the following manner. First, the private sector chooses between holding interest-yielding financial assets (Z) and non-interest yielding financial assets such as demand deposits and cash. The variable Z includes saving deposits, time deposits, and government bonds. The demand for these interest rate yielding assets and demand deposits are assumed to be homogeneous in nominal income. Thus, demand for these assets will change proportionately with the change in nominal income.

The allocation of Z and demand deposits will depend on the rate of return on Z, which is the weighted average of the rates of interest, and the cost of holding financial assets, i.e., inflation rate. As the regression results indicated in equations (20) and (21), the rate of return on Z has a positive impact on the aggregate interest yielding assets. The interest-yielding assets and the non interest yielding asset have a negative impact on each other as determined by identity. Inflation rate causes a reduction in the demand for financial assets. The negative impact of inflation is stronger in the case of interest-yielding financial assets than in the case of demand deposits.

Once the quantity of interest-yielding aggregated assets is determined, the portfolio allocation into time deposit, saving deposits, and government bonds can be determined. The latter variable is a determined by identity according to the

adding-up constraint. The shares of time deposits and saving deposits can be determined by equations (22) and (23) which indicate that all relevant rates of return in this set of portfolio are included. Lagged endogenous variables are included to allow disequilibrium stock adjustment. The estimation results obtained by the seemingly unrelated regression showed a substantial improvement over the results obtained by the OLS method. The estimated coefficients of their own rate of return variables and the cross-rate of return have the expected sins.

The Bank Portfolio Block

The total deposits of commercial banks are determined by the private sector portfolio allocation. The total deposits are demand determined, constituting domestic sources of available funds. However, commercial banks can choose to expand its activities by enlarging their portfolio size through foreign borrowing. Commercial banks' foreign liabilities are hypothesized to depend on their lending volume, available domestic resources, the relative cost of borrowing from either the central bank (discount rate) and from abroad (foreign interest rate). The estimated results are shown in equation (24). The estimated elasticities indicate that foreign borrowing will increase more rapidly than the increase in domestic lending. Another important finding is that the rediscount rate of the central bank can be used to stimulate or discourage foreign borrowing of commercial banks. Since foreign interest rate affects available financial resources of commercial banks, this equation serves as an international linkage between domestic

and international money markets.

Once the available financial resources are determined, commercial banks decide how to allocate their portfolio into government bonds (GBb), foreign assets (Fa), cash and reserves (CAb), and loans (L). Since the rates of interest of these assets tend to move by the same direction, multicollinearity problem is encountered in estimating bank portfolio equations. In addition, there are some regulations on bank portfolio. For example, commercial banks must hold government bonds up to a certain percentage in order to be allow the increase the number of their branches. Not all these rates of return are included in the estimating equations in this block. The estimation results are shown in equations (25)-(28).

The Identities

The identities consist of definitional equations. They comprise of the following items: monetary base (B), total deposits of commercial banks (D), notes in circulation (CAp) which are the balance sheet of the Bank of Thailand. The government bonds held by non-bank private sector (GDp) shows the difference between total interest-yielded financial assets (Z) and time and saving deposits. The balance sheet of commercial bans is imposed by specifying identity (33), relating commercial bans' borrowing from the central bank (Hb). Other identities include aggregate exports and imports, trade balance, current account balance and balance of payment proxied by the net foreign assets. Domestic absorption (A), national income identity, the

excess aggregate demand (E), budget deficit (Dg), and the stock of government external debt are among other identities in this model.

Identity (45), explaining Bf, is in fact the government budget constraint Bf is modeled as a residual from other means of deficit financing. This implies that the method of financing the budget deficit by foreign borrowing is the last resource. The size of monetary base varies according to the movements of claims on government and commercial banks as well as the net foreign assets. Consequently, the monetary authorities can control only the domestic source of monetary base, since the net foreign asset component of the monetary base varies by balance of payments condition under the fixed exchange rate regime.

3. HISTORICAL SIMULATION

Historical simulations of the model were employed to determine the model ability to replicate the real world. The sample period was extended to 1990 to clarify the current situation given the assumed exogenous. The constant adjustments were used in some behavior equations due to the structural change during 1987 to 1990. The predictive performance of the model can be determined by comparing the predicted paths of each variable with the actual paths in the sample period. The root mean square errors (RMSEs) from the static and dynamic simulations for only the 1985-1989 period are presented (see Table 4) because of lacking in 1990 actual value. The solutions derived from the

Table 4

Root Mean Square Errors
(Ratio to mean values)

Variables	1985-1989	
	Dynamic	Static
Xa	0.1056	0.0533
Xi	0.1204	0.1283
Xs	0.0945	0.0932
Ma	0.0774	0.0964
Mi	0.2216	0.2128
Mo	0.2454	0.2246
Ms	0.5176	0.4749
Qa	0.0881	0.0770
Qi	0.1214	0.1131
Cp	0.0391	0.0416
Ip	0.3677	0.3572
T	0.0218	0.0250
Pd	0.0301	0.0265
Pda	0.0468	0.0369
Pdi	0.0765	0.0386
Pc	0.0540	0.0382
PM	0.0222	0.0222
Rd	0.0510	0.0534
F	0.1771	0.4885
Z	0.0762	0.0914
DD	0.0606	0.0840
SD	0.0818	0.1131
TD	0.0856	0.0970
FI	0.3421	0.3520
L	0.1250	0.1428
GBb	0.0697	0.0589
Fa	0.1766	0.1897
CAb	0.0300	0.0449
B	0.1067	0.4096
D	0.0768	0.0930
CAp	0.1485	0.5707
GBp	0.1383	0.0907
Hb	0.2714	0.2644
X	0.1063	0.0864
XN	0.1154	0.0963
M	0.1953	0.1879
MN	0.2198	0.2057
TBD	0.2921	0.3432
CAD	0.0741	0.6947
A	0.0979	0.0981
Y	0.0772	0.0747
E	0.0107	0.0112
Dg	0.1113	0.1278
Bf	0.0233	0.0333
Hf	0.0817	0.3242
M1	0.0903	0.3667
Pdh	0.0441	0.0390

static and dynamic simulations for the period mentioned above are fairly satisfactory. The RMSEs from dynamic simulation vary from 1.1 to 51.8 percent of its means value.

Large simulation errors mainly arise from definitional equations, for example, the trade deficits. The predicted paths of all endogenous variables turned out as expected.

Theil inequality coefficient (U) is the RMS errors scaled down by the denominator such that its value always falls between 0 and 1 (Pindyck and Rubinfeld, 1981). A zero value of U indicates a perfect fit when the simulated value equals the actual value in every period. The Theil's inequality coefficients calculated from 1985-1989 dynamic simulation with the breakdown of their components are presented in Table 5.

4. COUNTERFACTUAL SIMULATION

4.1 Permanent Decrease in U.S. Government Spending on Goods and Services

The permanent decrease in U.S. government spending on goods and services equal to one percent of GDP has a direct impact on world demand for imports. Thus the U.S. government spending elasticity of world demand for imports was derived by using world impart trend (Yw) as a proxy of world demand for imports. The elasticity is equal to 0.42.

Thus, the permanent decrease in U.S. government has shown the negative impact to our exports and GDP as shown in

Table 5

Theil's Inequality Coefficients and their Compositions
1985 - 1989 (Dynamic)

Variables	T	B	V	C
Xa	0.0545	0.6031	0.3745	0.0224
Xi	0.0575	0.0863	0.4824	0.4313
Xs	0.0438	0.2223	0.1585	0.6193
Ma	0.0376	0.0002	0.1529	0.8469
Mi	0.1124	0.1473	0.5709	0.2818
Mo	0.1260	0.1119	0.1868	0.7012
Ms	0.3078	0.6501	0.0535	0.2964
Qa	0.0444	0.0785	0.5662	0.3553
Qi	0.0610	0.0771	0.4110	0.5118
Cp	0.0195	0.0162	0.4125	0.5712
Ip	0.1904	0.1715	0.3223	0.5061
T	0.0105	0.0033	0.0975	0.8992
Pd	0.0149	0.1211	0.5424	0.3365
Pda	0.0228	0.8692	0.0220	0.1088
Pdi	0.0372	0.4621	0.5157	0.0221
Pc	0.0267	0.0628	0.8161	0.1210
PM	0.0110	0.0000	0.5158	0.4841
Rd	0.0255	0.0015	0.4795	0.5189
F	0.0599	0.1535	0.6924	0.1541
Z	0.0373	0.0088	0.2995	0.6917
DD	0.0294	0.0024	0.3870	0.6106
SD	0.0381	0.0637	0.1871	0.7492
TD	0.0424	0.0234	0.3966	0.5800
FI	0.1692	0.0165	0.9818	0.0017
L	0.0608	0.0023	0.6344	0.3633
GBb	0.0342	0.0029	0.3301	0.6670
Fa	0.0864	0.0032	0.1392	0.8576
CAb	0.0148	0.2052	0.0082	0.7866
B	0.0499	0.5882	0.3125	0.0993
D	0.0374	0.0011	0.3257	0.6732
CAp	0.0679	0.6212	0.3137	0.0650
GBp	0.0737	0.8856	0.0183	0.0961
Hb	0.1196	0.5499	0.0114	0.4386
X	0.0533	0.3237	0.4870	0.1893
XN	0.0566	0.2836	0.5224	0.1939
M	0.0989	0.1392	0.5374	0.3233
MN	0.1092	0.1779	0.6919	0.1302
TBD	0.1131	0.8508	0.0000	0.1492
CAD	0.0282	0.0060	0.0000	0.9940
A	0.0495	0.1215	0.4864	0.3920
Y	0.0389	0.1277	0.3806	0.4917
E	0.0054	0.2167	0.4009	0.3823
Dg	0.0382	0.0033	0.1781	0.8187
Bf	0.0116	0.0088	0.1767	0.8145
Hf	0.0345	0.0205	0.8911	0.0884
M1	0.0421	0.7216	0.2113	0.0670
Pdh	0.0223	0.5052	0.0225	0.4723

Note: T = Theil inequality coefficients.
B = Fraction of error due to Bias.
V = Fraction of error due to Different Variation.
C = Fraction of error due to Different Covariation.

Table 6. The decrease of GDP growth is, on average 1.3 percent from the baseline. The decrease in income leads to the decrease imports and then to the production. However, the decrease in imports is slightly higher than the decrease in exports; the results of this phenomenon have shown the improvement in the trade balance.

If the government selects an export promotion policy by devalue the bath currency against the U.S. dollar by 3%, 2.7%, 2.4%, 2.1%, 1.8% and 1.5%, respectively for the six year period of simulation. The devaluation has the direct effect to the effective exchange rate which shows the percentage change of 14.5, 16.4, 8.4, 2.2, -3.0 and -4.0 respectively.

It shows that devaluation has an expansionary effect on output and price level (See Table 7). The quantity of total imports increases over the expansion of total exports in some years, therefore, the trade balance is also worsen on those years. As the estimation result of equation (19) indicates, devaluation has a negative impact on capital inflows. The fact that overvaluation of the exchange rate has been mitigated by a devaluation implies that borrowing from abroad becomes more expensive. Nevertheless, the balance of payments, as indicated by the amount of the net foreign assets, does not noticeable improve. It should be noted that the exchange rate devaluation affects the unrecorded transactions which appear as statistical discrepancies in the balance of payments account. Over-invoicing of imports, under-invoicing of exports or other illegal activities of capital transfers may be reduced after devaluation.

Table 6

Permanent Fall in U.S. Government Spending: No Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	-0.36	0.16	0.12	-0.93	-5.13	-15.63
Xi	-0.16	-0.04	-0.15	-0.76	-3.03	-9.23
Xs	-1.20	-2.01	-2.63	-3.07	-3.37	-3.59
Ma	-0.44	-0.24	-0.53	-0.49	-2.37	-8.66
Mi	-0.64	-0.34	-0.79	-0.74	-4.16	-14.30
Mo	-0.65	-0.32	-0.71	-0.78	-4.96	-17.10
Ms	-0.53	-0.37	-0.20	-55.67	9.18	-1310.62
Qa	-0.20	-0.10	-0.21	-0.23	-1.51	-5.46
Qi	-0.28	-0.14	-0.30	-0.33	-2.12	-7.61
Cp	-0.05	-0.08	-0.11	-0.02	-0.36	-1.31
Ip	-0.83	-0.27	-0.75	0.84	-2.36	-18.22
T	-0.29	-0.36	-0.63	-0.89	-0.46	-6.79
Pd	0.22	-0.31	-0.08	0.69	3.24	9.68
Pda	0.24	-0.34	-0.09	0.76	3.57	10.72
Pdi	0.23	-0.33	-0.08	0.74	3.49	10.46
PM	0.00	0.00	0.00	0.00	0.00	0.00
Rd	0.01	-0.16	-0.14	-0.27	0.00	-0.51
F	-0.44	-0.42	-0.79	21.59	22.68	-4.10
Z	-0.08	-0.23	-0.26	0.21	0.26	0.01
DD	-0.19	-0.07	-0.27	-0.08	-0.81	-3.99
TD	-0.08	-0.23	-0.26	0.21	0.26	0.01
SD	-0.08	-0.23	-0.26	0.21	0.26	0.01
Fl	-0.04	-0.16	-0.17	0.06	0.14	-0.13
L	-0.08	-0.26	-0.27	0.14	0.26	-0.18
GBb	-0.08	-0.23	-0.24	0.15	0.25	-0.15
Fa	-0.08	-0.18	-0.20	0.22	0.25	-0.05
CAb	-0.07	-0.22	-0.24	0.14	0.24	-0.16
B	-0.73	-0.35	-0.41	7.50	31.57	16.34
D	-0.08	-0.26	-0.27	0.15	0.27	-0.17
CAp	-1.00	-0.41	-0.48	10.09	40.34	19.38
GBp	-0.08	-0.23	-0.26	0.21	0.26	0.01
Hb	-0.09	-0.19	-0.18	0.11	0.24	-0.64
X	-0.29	0.08	-0.01	-0.84	-4.04	-12.42
XN	-0.28	0.06	-0.03	-0.83	-3.90	-11.89
M	-0.62	-0.32	-0.73	-0.71	-3.98	-13.77
MN	-0.62	-0.32	-0.74	-0.71	-3.92	-13.62
Hf	-1.30	-0.42	-0.43	6.25	19.98	11.16
TBD	-1.53	-2.26	-4.26	-0.03	-1.05	-8.79
CAD	-1.09	5.01	-0.76	-10.92	7.26	1.98
Y	-0.20	-0.06	-0.22	-0.19	-1.61	-5.51
E	-0.00	-0.02	-0.02	0.07	0.07	-0.08
M1	-0.74	-0.30	-0.42	6.67	28.68	15.06
Dg	0.48	0.76	2.13	344.09	8.88	67.03

Table 7

Permanent Fall in U.S. Government Spending: With Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	-0.35	0.89	0.89	-0.32	-3.60	-13.19
Xi	0.36	0.99	1.31	2.23	1.66	-4.54
Xs	-0.66	-1.25	-1.78	-0.58	0.14	-0.95
Ma	-0.38	0.58	0.43	1.05	-0.11	-6.08
Mi	-0.55	0.87	0.63	1.49	-0.26	-10.24
Mo	-0.56	0.91	0.65	1.46	-0.49	-12.29
Ms	-0.38	2.72	0.79	-49.54	16.24	-1396.05
Qa	-0.17	0.27	0.19	0.43	-0.15	-3.85
Qi	-0.24	0.38	0.27	0.61	-0.21	-5.38
Cp	-0.04	0.02	0.05	0.26	0.18	-0.65
Ip	-1.05	1.05	0.90	2.60	2.02	-13.27
T	-0.26	0.23	0.50	0.70	2.11	-3.26
Pd	0.22	-0.74	-0.23	0.74	2.61	8.50
Pda	0.24	-0.82	-0.25	0.82	2.88	9.41
Pdi	0.23	-0.80	-0.25	0.80	2.81	9.18
PM	0.00	0.00	0.00	0.00	0.00	0.00
Rd	0.00	-0.22	0.08	0.18	0.58	0.74
F	-4.52	-1.07	-1.02	15.51	19.47	-3.31
Z	-0.05	-0.15	0.08	0.85	1.31	1.06
DD	-0.16	0.18	0.05	0.44	0.41	-2.60
TD	-0.05	-0.15	0.08	0.85	1.31	1.06
SD	-0.05	-0.15	0.08	0.85	1.31	1.06
Fl	-0.03	-0.11	0.04	0.48	0.79	0.53
L	-0.05	-0.14	0.05	0.82	1.32	0.88
GBb	-0.05	-0.12	0.04	0.77	1.24	0.83
Fa	-0.05	-0.04	0.02	0.72	1.10	0.69
CAb	-0.05	-0.12	0.04	0.75	1.21	0.82
B	-2.44	-1.05	-0.24	4.67	25.67	14.26
D	-0.06	-0.14	0.05	0.83	1.33	0.89
CAp	-3.42	-1.38	-0.34	6.08	32.56	16.75
GBp	-0.05	-0.15	0.08	0.85	1.31	1.06
Hb	-0.06	-0.12	0.05	0.65	1.48	2.72
X	-0.11	0.94	1.10	1.03	-0.87	-8.85
XN	-0.05	0.94	1.13	1.14	-0.52	-8.14
M	-0.53	0.84	0.60	1.43	-0.27	-9.84
MN	-0.53	0.84	0.61	1.43	-0.25	-9.74
Hf	-4.53	-1.58	-0.35	3.69	16.05	9.57
TBD	-1.81	0.19	-2.22	1.63	0.66	-6.90
CAD	-2.10	15.72	7.36	-10.84	5.72	3.35
Y	-0.17	0.28	0.22	0.43	-0.21	-3.88
E	-0.00	-0.00	0.06	0.20	0.26	0.12
M1	-2.39	-0.87	-0.22	4.18	23.45	13.18
Dg	0.44	-0.49	-1.67	-272.19	-40.82	32.18

4.2 Permanent Monetary Contraction in OECD

The five percent monetary contraction in OECD has caused the expansion in foreign interest rate, Rf, which is shown in equation (18): Demand for loans, equation (19): Capital inflows and equation (24): Foreign Liabilities of Commercial Bank.

The simulation exercise is done by increasing the foreign interest rate by 2.5, 2.0, 1.25, 0.5, 0, and 0 percentage points. The results of this exercise is reported in Table 8. In effect, there will be an increase in net capital inflows which apparent, improve the balance of payment position. The improvement in the balance of payment will expand the monetary base and eventually will raise the inflation of the country. For the bank portfolio, the increase in the foreign interest rate will force the commercial banks to depend more on local source of fund and force the local interest rate on commercial bank credit to increase. The contraction in commercial loans will be followed by the contract in the expenditure component of income, i.e., consumption and investment, and also the tax revenue. Finally, there will be a showdown in the economic growth rate with higher deficit in the government budget.

If the government has the policy to intervene the movement of the local loan interest rate. the correlation between the local and the foreign loan interest rates has been checked and the result is that the elasticity equals 0.32. Thus, the

Table 8

Permanent Monetary Contraction in OECD: No Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	-0.32	-1.16	-5.00	-8.14	-17.76	-28.84
Xi	-0.16	-0.68	-2.62	-5.40	-11.13	-20.23
Xs	0.00	0.00	0.00	0.00	0.00	0.00
Ma	-0.19	0.01	-2.79	-3.33	-8.25	-15.22
Mi	-0.29	-0.00	-4.14	-4.94	-14.04	-24.34
Mo	-0.30	-0.08	-4.24	-5.09	-16.86	-29.11
Ms	-0.32	-1.50	-1.70	-66.68	-4.51	-1128.40
Qa	-0.09	-0.02	-1.29	-1.55	-5.37	-9.78
Qi	-0.13	-0.03	-1.81	-2.18	-7.50	-13.51
Cp	-0.09	-0.02	-0.23	-0.22	-1.21	-2.68
Ip	0.05	2.64	-3.42	-1.29	-14.27	-30.77
T	-0.13	-0.03	-2.03	-3.42	-6.21	-15.15
Pd	0.22	0.73	3.03	3.80	10.22	16.06
Pda	0.24	0.81	3.35	4.20	11.32	17.84
Pdi	0.23	0.79	3.27	4.10	11.05	17.39
PM	0.00	0.00	0.00	0.00	0.00	0.00
Rd	6.10	9.98	10.66	7.02	4.04	-0.79
F	18.84	51.32	63.68	65.15	34.97	-5.10
Z	0.02	0.43	0.46	0.64	0.10	-1.18
DD	-0.09	0.20	-0.47	0.01	-2.27	-5.59
TD	0.02	0.43	0.46	0.64	0.10	-1.18
SD	0.02	0.43	0.46	0.64	0.10	-1.18
Fl	-9.02	-7.82	-4.27	-0.92	0.41	-0.81
L	-0.89	-0.18	0.26	0.67	0.17	-1.39
GBb	-0.27	-0.02	0.04	0.38	-0.08	-1.33
Fa	-2.90	-3.57	-2.91	-1.36	-1.10	-1.17
CAb	0.02	0.34	0.34	0.55	0.02	-1.30
B	3.44	13.36	13.11	41.58	65.97	33.10
D	0.02	0.39	0.38	0.60	0.03	-1.41
CAp	4.84	17.88	17.45	55.97	84.42	39.41
GBp	0.02	0.43	0.46	0.64	0.10	-1.18
Hb	-5.07	-2.16	-0.51	0.50	0.56	-4.25
X	-0.27	-0.96	-3.85	-6.69	-14.32	-24.52
XN	-0.25	-0.93	-3.66	-6.56	-13.88	-23.81
M	-0.28	-0.02	-3.98	-4.76	-13.52	-23.52
MN	-0.28	-0.01	-3.99	-4.75	-13.29	-23.25
Hf	9.68	22.88	17.50	34.66	41.75	22.74
TBD	-0.34	4.67	-4.84	2.71	-1.86	-9.12
CAD	-0.66	24.38	-35.24	-15.26	-6.02	-4.28
Y	-0.10	0.01	-1.26	-1.54	-5.51	-9.86
E	0.01	0.10	0.03	0.06	-0.04	-0.39
M1	3.29	12.14	11.91	37.14	59.86	31.10
Dg	0.22	0.07	6.84	1324.63	120.15	149.56

Table 9

Permanent Monetary Contraction in OECD: With Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	0.06	-12.10	-13.45	-10.34	-6.28	-8.65
Xi	-0.16	-5.20	-9.58	-10.43	-8.89	-9.63
Xs	0.00	0.00	0.00	0.00	0.00	0.00
Ma	2.21	-8.62	-9.44	-7.40	-3.91	-5.17
Mi	3.23	-12.53	-13.54	-10.63	-6.62	-8.46
Mo	3.16	-12.92	-13.61	-10.49	-7.71	-10.11
Ms	1.82	-32.33	-10.14	-79.42	-13.29	-1181.45
Qa	0.93	-4.05	-4.28	-3.26	-2.37	-3.14
Qi	1.32	-5.67	-5.99	-4.57	-3.33	-4.40
Cp	0.34	-0.73	-1.38	-1.29	-1.11	-0.91
Ip	9.96	-16.10	-16.23	-11.14	-6.45	-9.53
T	1.57	-5.26	-10.68	-11.32	-8.11	-9.10
Pd	0.22	8.92	4.17	1.07	-0.39	3.35
Pda	0.24	9.87	4.60	1.18	-0.43	3.70
Pdi	0.23	9.63	4.49	1.16	-0.42	3.61
PM	0.00	0.00	0.00	0.00	0.00	0.00
Rd	–	–	–	–	–	–
F	109.20	3.97	-15.03	7.14	7.44	3.65
Z	1.05	0.72	-1.86	-2.57	-2.48	-1.08
DD	0.94	-2.68	-1.55	-0.87	-0.69	-1.45
TD	1.05	0.72	-1.86	-2.57	-2.48	-1.08
SD	1.05	0.72	-1.86	-2.57	-2.48	-1.08
Fl	-6.87	-8.19	-6.55	-3.45	-1.78	0.07
L	0.73	-0.20	-2.35	-2.61	-2.50	-0.83
GBb	0.23	0.23	-1.77	-2.24	-2.14	-1.22
Fa	-6.28	-2.22	-2.05	-1.80	-1.04	-2.81
CAb	0.88	0.46	-1.66	-2.20	-2.17	-1.01
B	40.76	19.71	1.32	-7.99	2.47	10.53
D	1.04	0.54	-1.87	-2.43	-2.39	-1.09
CAp	57.14	26.38	2.21	-10.12	3.68	12.64
GBp	1.05	0.72	-1.86	-2.57	-2.48	-1.08
Hb	-1.65	-2.48	-2.78	-2.65	-3.24	-0.82
X	-0.01	-9.19	-11.57	-10.39	-7.63	-9.14
XN	-0.03	-8.74	-11.26	-10.40	-7.80	-9.22
M	3.08	-12.08	-12.98	-10.17	-6.33	-8.15
MN	3.09	-12.09	-13.04	-10.21	-6.25	-8.06
Hf	77.41	33.22	3.47	-5.76	2.07	7.21
TBD	11.35	-27.29	-19.43	-5.07	2.49	-1.54
CAD	18.03	-193.50	-155.46	-42.25	2.91	9.47
Y	0.93	-4.03	-4.22	-3.29	-2.38	-3.18
E	0.26	0.07	-0.57	-0.70	-0.57	-0.34
M1	39.39	16.96	1.05	-7.01	2.44	10.04
Dg	-2.66	11.08	35.87	4384.14	156.73	89.83

Table 10

Temporary Oil Price Shock: No Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	-5.21	-14.35	-16.08	-13.52	-1.79	2.66
Xi	-2.48	-10.06	-14.93	-15.87	-11.27	-6.22
Xs	0.00	0.00	0.00	0.00	0.00	0.00
Ma	-2.25	-9.72	-11.65	-11.76	-2.98	-0.77
Mi	-3.37	-14.03	-16.63	-16.71	-4.96	-1.02
Mo	-5.95	-15.92	-17.57	-16.80	-5.34	-1.27
Ms	-4.68	-40.05	-12.70	-93.84	-30.09	-1064.77
Qa	-1.82	-5.05	-5.62	-5.35	-1.63	-0.38
Qi	-2.56	-7.05	-7.83	-7.47	-2.29	-0.54
Cp	-0.07	-0.95	-1.65	-1.97	-1.39	-0.48
Ip	-1.28	-16.28	-18.98	-19.87	-5.50	-0.36
T	-1.71	-8.44	-14.57	-16.26	-10.68	-7.76
Pd	3.55	8.17	5.03	1.88	-5.13	-2.78
Pda	3.92	9.04	5.56	2.08	-5.64	-3.06
Pdi	3.83	8.82	5.43	2.03	-5.51	-2.99
PM	10.25	7.49	4.48	1.18	0.00	0.00
Rd	-0.06	-0.30	-3.82	-6.51	-8.34	-6.32
F	-7.94	-17.99	-31.76	-15.07	-3.49	-5.91
Z	0.81	-0.08	-2.43	-4.05	-4.60	-1.87
DD	-0.99	-2.44	-2.09	-2.25	-0.79	0.04
TD	0.81	-0.08	-2.43	-4.05	-4.60	-1.87
SD	0.81	-0.08	-2.43	-4.05	-4.60	-1.87
Fl	0.35	-0.18	-1.83	-2.91	-3.29	-1.54
L	0.69	-0.26	-2.55	-4.11	-4.55	-2.03
GBb	0.66	-0.22	-2.14	-3.55	-3.88	-1.68
Fa	0.67	-0.11	-1.07	-1.92	-1.79	-0.44
CAb	0.61	-0.21	-2.16	-3.57	-3.95	-1.75
B	25.07	16.33	3.11	-25.51	-21.20	-11.18
D	0.72	-0.25	-2.44	-3.95	-4.34	-1.90
CAp	35.12	22.04	4.74	-33.36	-26.19	-12.95
GBp	0.81	-0.08	-2.43	-4.05	-4.60	-1.87
Hb	0.71	-0.23	-1.87	-3.67	-5.98	-7.61
X	-4.26	-12.54	-15.52	-14.76	-6.71	-1.80
XN	-4.05	-12.26	-15.43	-14.87	-7.33	-2.53
M	-3.85	-13.88	-16.15	-16.07	-4.68	-1.02
MN	6.91	-9.92	-14.05	-15.70	-4.66	-1.00
Hf	46.52	26.15	5.24	-20.08	-12.52	-7.23
TBD	35.96	3.57	-4.01	-11.06	5.84	2.15
CAD	52.16	-29.57	-77.06	-64.65	7.12	14.69
Y	-1.08	-4.46	-5.25	-5.23	-1.71	-0.25
E	0.29	-0.04	-0.70	-1.11	-1.01	-0.40
M1	23.71	14.10	2.63	-22.89	-19.00	-10.55
Dg	2.91	17.77	48.97	6298.84	206.38	76.58

aforementioned exercise. For the simulation period, we observe that the contraction in GDP is 3 percent on the six year average while the average shrinkage in value added of both agricultural products and industrial products are 3.3 percent and 4.62 percent, respectively. The percentage increase in inflation rate is positive for the first four years and become negative for the last two ones.

The deficits in trade balance and current accounts are enlarged in some years due to the temporary, oil price shock along with the vibration the balance of payments.

If the government decides to use the price control policy which can be examined by exogenizing by price level. The results are shown in Table 11 we observe that the contraction in GDP is smaller and turn out to be the expansion in the last three year along with the expansion of value added in both sector. However, the expansion in income and output have made the trade balance and current account much worsen.

5. CONCLUDING REMARKS

The objective of this paper has been to provide the understanding of the macroeconomic adjustments of the Thai economy. We employ a small macroeconometric model as a means to examining macroeconomic behaviors. We have found several important empirical relationships. The domestic price is partly determined by the international price level. However, domestic capacity utilization or the degree of excess domestic demand also

Table 11

Temporary Oil Price Shock: With Policy Response
(Percentage Deviation from Baseline Solution)

Variable	1985	1986	1987	1988	1989	1990
Xa	2.34	-4.47	-3.50	3.18	7.58	14.56
Xi	1.09	-3.06	-4.95	-2.64	1.52	8.35
Xs	0.00	0.00	0.00	0.00	0.00	0.00
Ma	3.59	-2.52	-2.68	2.11	4.69	7.61
Mi	5.31	-3.76	-3.89	3.17	8.27	13.10
Mo	2.75	-5.76	-4.89	3.17	9.92	15.66
Ms	3.74	-12.11	-3.64	-44.72	25.47	-1757.47
Qa	0.81	-1.76	-1.49	0.94	2.87	4.45
Qi	1.15	-2.47	-2.09	1.32	4.07	6.33
Cp	0.45	0.02	-0.39	-0.04	0.59	0.95
Ip	10.33	-2.71	-4.02	6.64	17.02	18.07
T	2.21	-0.32	-2.17	-0.20	5.14	9.28
Pd	–	–	–	–	–	–
Pda	-1.64	4.42	0.32	-3.93	-3.74	-6.46
Pdi	-1.60	4.32	0.32	-3.84	-3.65	-6.32
PM	10.25	7.49	4.48	1.18	0.00	0.00
Rd	-0.06	2.07	0.75	-0.36	1.13	4.19
F	3.03	5.52	4.63	30.81	41.09	4.57
Z	0.72	1.04	-0.92	-1.04	0.72	0.63
DD	1.48	-0.85	-0.44	0.74	1.58	2.53
TD	0.72	1.04	-0.92	-1.04	0.72	0.63
SD	0.72	1.04	-0.92	-1.04	0.72	0.63
Fl	0.37	0.82	-0.43	-0.57	0.56	0.69
L	0.73	1.01	-0.88	-0.97	0.85	0.78
GBb	0.70	0.76	-0.89	-0.92	0.75	0.56
Fa	0.71	0.04	-1.09	-0.82	0.47	-0.25
CAb	0.65	0.79	-0.83	-0.89	0.76	0.63
B	44.85	48.80	41.92	61.64	103.60	85.26
D	0.77	0.91	-0.94	-0.99	0.83	0.68
CAp	62.98	65.44	56.33	83.48	132.39	100.86
GBp	0.72	1.04	-0.92	-1.04	0.72	0.63
Hb	0.76	0.95	-0.49	-0.72	1.02	3.13
X	1.90	-3.87	-4.20	0.11	4.43	11.44
XN	1.81	-3.78	-4.32	-0.16	4.04	10.93
M	4.47	-4.05	-3.94	3.03	7.93	12.55
MN	16.25	0.41	-1.47	3.53	7.80	12.43
Hf	83.55	76.93	55.26	51.90	65.55	57.88
TBD	54.34	21.75	13.53	12.73	11.92	7.88
CAD	83.97	107.28	62.93	21.43	37.73	31.80
Y	1.56	-1.18	-1.12	1.06	2.83	4.54
E	0.25	0.25	-0.21	-0.11	0.25	0.36
M1	43.56	43.94	38.79	55.64	95.32	82.70
Dg	-3.76	0.68	7.28	76.32	-99.45	-91.65

plays an important role in determining the price adjustment. Similarly, the domestic interest rate adjusts according to the international level of interest rate as well as the degree of liquidity of domestic money markets.

There are two important channels in which international disturbances can exert their disruptive influences on the domestic economy: (1) the transmissions through the prices of tradable and through the foreign interest rates; (2) the transmissions through the volume of trade and foreign capital inflows, as effected by changes in world income. The empirical evidence which shows that the international capital mobility is not perfect implies some degree of effectiveness of monetary policy.

Another important empirical relationship is found in the allocation behaviors of financial assets in the private portfolio. Financial assets are allocated according to their relative attractiveness in the portfolio.

One important conclusion emerging from policy simulation analysis is that external shocks create a permanent loss in output and employment. An appropriate policy response in thus required. However, it by no means suggests that the government should become a policy activist, since there are some limitations of stabilization policy.

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Appendix

Results of The Estimations
(1970 - 1989)

Foreign trade block:

$$\ln(Xa) = -9.126 + 0.945^{**}\ \ln(Pxat(-1)) - 1.210^{*}\ \ln(Pda) + 1.202^{**}\ \ln(Qa+Qp) + 0.567^{*}\ \ln(Xa(-1))$$

(3.503) (2.863) (3.831) (2.969)

where Pxat = Pxa(1-txa)*e

$R^2 = 0.975$ Dh = -0.78 S = 0.074

Xa = export values of agricultural products (real)
Pxa = export price index of agricultural products
Pda = domestic price index of agricultural products
Qa = value added of agricultural products
Qp = value added of public utilities
txa = export tariff rate of agricultural products
e = effective exchange rate index

$$\ln(Xi) = -6.348 + 0.669^{**}\ \ln(e*Pfi/Pdi) + 2.306^{*}\ \ln[Qi/Y](-1) + 0.592^{**}\ \ln(Xi(-1))$$

(3.302) (2.524) (5.089)

$R^2 = 0.962$ Dh = -0.44 S = 0.152

Xi = export values of industrial products (real)
e = effective exchange rate index
Pfi = export price index of industrial countries
Pdi = domestic price index of industrial products
Qi = value added of industrial products (real)
Y = gross domestic products (real)

$$\ln(Xs) = -1.994 + \underset{(2.794)}{0.699^{*}}\ln(Yw*e) + \underset{(5.119)}{0.687^{**}}\ln(Xs(-1))$$

$R^2 = 0.980$ Dh = 0.99 S = 0.123

Xs = non-merchandise exports
Yw = world import trend (real)
e = effective exchange rate index

$$\ln(Ma) = -13.087 - \underset{(2.938)}{0.658^{**}}\ln(Pma(1+ta)*e) + \underset{(0.342)}{0.069}\ln(Pda) + \underset{(4.299)}{2.353^{**}}\ln(Y/Y^{*}) + \underset{(13.623)}{1.916^{**}}\ln(Y^{*})$$

$R^2 = 0.984$ DW = 2.14 S = 0.074

Ma = import values of agricultural products (real)
Pma = import price index of agricultural products
ta = tariff rate of agricultural products
e = effective exchange rate index
Pda = domestic price index of agricultural products
Y = gross domestic products (real)
Y* = trend of income (real)

$$\ln(Mi) = -8.613 - \underset{(1.328)}{0.516}\ln(Pmi(1+ti)*e) + \underset{(0.275)}{0.073}\ln(Pdi) + \underset{(4.186)}{3.422^{**}}\ln(Y/Y^{*}) + \underset{(4.782)}{1.661^{**}}\ln(Y^{*})$$

$R^2 = 0.953$ DW = 1.769 S = 0.094

Mi = import values of industrial products (real)
Pmi = import price index of industrial products
ti = tariff rate of industrial products
e = effective exchange rate index
Pdi = domestic price index of industrial products
Y = gross domestic products (real)
Y* = trend of income (real)

$$(6)\ \ln(Mo) = 5.206 - 0.062 \ln(Pmo(1+to)*e/Pdo) + 3.365^{**} \ln(Y/Y^*) + 0.419^{**} \ln(Y^*)$$
$$(1.163) \qquad (9.585) \qquad (13.011)$$

$R^2 = 0.914$ DW = 2.05 S = 0.056

Mo = import values of petroleum products (real)
Pmo = import price index of petroleum products
to = tariff rate of petroleum products
e = effective exchange rate index
Pdo = domestic price index of petroleum products
Y = gross domestic products (real)
Y* = trend of income (real)

$$(7)\ \ln(Ms) = -4.920 + 1.159^{*} \ln(Ma+Mi+Mo+Xa+Xi) - 0.217\ (D7384) + 0.318^{*}\ (D7980)$$
$$(2.764) \qquad (2.104) \qquad (2.248)$$

$R^2 = 0.962$ DW = 2.06 S = 0.188

Ms = non-merchandise imports (real)
Ma = import values of agricultural products (real)
Mi = import values of industrial products (real)
Mo = import values of petroleum products (real)
Xa = export values of agricultural products (real)
Xi = export values of industrial products (real)
D7384 = dummy variable (1 for 1973 and 1984, otherwise 0)
D7980 = dummy variable (1 for 1979 and 1980, otherwise 0)

Aggregate Demand and Supply:

$$(8)\ \ln(Qa) = 6.185 + 0.104 \ln(Ka) + 0.433 \ln(Na) + 0.299^{*} \ln(Mo)$$
$$(1.387) \qquad (2.081) \qquad (2.839)$$

$R^2 = 0.925$ DW = 2.31 S = 0.047

Qa = value added of agricultural products
Ka = capital stocks in agricultural sector (real)
Na = number of labor employed in agricultural sector
Mo = import values of petroleum products (real)

$$(9)\ \ln(Qi) = -1.762 + \underset{(18.635)}{0.726^{**}}\ \ln(Ki) + \underset{(2.117)}{0.126}\ \ln(Ni) + \underset{(6.531)}{0.422^{**}}\ \ln(Mo)$$

$R^2 = 0.995$ DW = 2.37 S = 0.035

Qi = value added of industrial products
Ki = capital stocks in industrial sector (real)
Ni = number of labor employed in industrial sector
Mo = import values of petroleum products (real)

$$(10)\ \ln(Cp) = 2.673 + \underset{(4.011)}{0.332^{**}}\ \ln(Y-(T/Pd)) + \underset{(3.549)}{0.375^{**}}\ \ln(Cp(-1)) + \underset{(2.909)}{0.086^{*}}\ \ln(L)$$

$R^2 = 0.999$ Dh = -1.13 S = 0.010

Cp = private consumption expenditures (real)
Y = gross domestic products (real)
T = government tax revenues
Pd = GDP deflator
L = commercial bank credits

$$(11)\ \ln(Ip) = 6.012 - \underset{(3.054)}{2.888^{**}}\ \ln(Kp(-1)) + \underset{(3.782)}{3.267^{**}}\ \ln(Y) + \underset{(1.632)}{0.118}\ \ln[(CAp-CAp(-1)+L-L(-1)+F)/Pd]$$

$R^2 = 0.960$ DW = 0.94 S = 0.086

Ip = private capital formation expenditures (real)
Kp = private capital stocks (real)
Y = gross domestic products (real)
CAp = notes in circulation
L = commercial bank credits
F = foreign capital inflows
Pd = GDP deflator

(12) $\ln(T) = -4.876 + 0.370 \ln(M) + 0.275 \ln(Cp+Ip+(Cg+Ig)/Pd)$
(1.725) (0.375)

$+ 0.718^{*} \ln(T(-1))$
(2.844)

$R^2 = 0.993$ DW = 2.00 S = 0.069

T = government tax revenues
M = aggregate merchandise imports (real)
Cp = private consumption expenditures (real)
Ip = private capital formation expenditures (real)
Cg = public consumption expenditures
Ig = public capital formation
Pd = GDP deflator

Price block:

(13) $\ln(Pd) = -0.060 + 0.316^{**} \ln(PM) + 0.073 \ln(Pxa) + 0.209 \ln(M1(-1))$
(3.722) (1.509) (1.300)

$+ 0.046 \ln(E)$
(0.335)

$R^2 = 0.994$ DW = 1.57 S = 0.028

Pd = GDP deflator
PM = aggregate import price index
Pxa = export price index of agricultural products
M1 = money supply (narrow definition)
E = demand pressure variable

(14) $\ln(Pda) = -0.521 + 1.102^{**} \ln(Pd)$
(14.183)

$R^2 = 0.993$ DW = 1.66 S = 0.035

Pda = domestic price index of agricultural products
Pd = GDP deflator

$$(15)\quad \ln(Pdi) = -0.432 + \underset{(12.685)}{1.076^{**}}\ \ln(Pd)$$

$R^2 = 0.993$ DW = 1.60 S = 0.034

Pdi = domestic price index of industrial products
Pd = GDP deflator

$$(16)\quad \ln(Pc) = -0.610 + \underset{(17.262)}{1.132^{**}}\ \ln(Pd)$$

$R^2 = 0.997$ DW = 1.23 S = 0.023

Pc = consumer price index
Pd = GDP deflator

$$(17)\quad \ln(PM) = -0.447 + \underset{(0.640)}{0.071}\ \ln(Pma(1+ta)*e) + \underset{(9.303)}{0.759^{**}}\ \ln(Pmi(1+ti)*e) + \underset{(10.510)}{0.241^{**}}\ \ln(Pmo(1+to)*e)$$

$R^2 = 0.997$ DW = 2.50 S = 0.031

PM = aggregate import price index
e = effective exchange rate index
Pma = import price index of agricultural products
Pmi = import price index of industrial products
Pmo = import price index of petroleum products
ta = tariff rate of agricultural products
ti = tariff rate of industrial products
to = tariff rate of petroleum products

Financial block:

Interest Rate and Capital Flows:

$$\ln(Rd) = -1.095 - \underset{(1.889)}{0.081}\ln(L) + \underset{(5.604)}{0.223}^{**}\ln(Rf) + \underset{(1.850)}{0.220}\ln(Ip(-1)) + \underset{(5.448)}{0.627}^{**}\ln(Rd(-1)) \quad (18)$$

$R^2 = 0.858$ Dh = -1.49 S = 0.048

Rd = interest rate on commercial bank credits
L = commercial bank credits
Rf = foreign interest rate (Eurodollar rate)
Ip = private capital formation expenditures (real)

$$\ln(F) = -34.469 + \underset{(7.413)}{6.969}^{**}\ln(Rd) - \underset{(2.907)}{0.898}^{*}\ln(Rf) - \underset{(3.713)}{3.541}^{**}\ln(e) + \underset{(3.318)}{2.100}^{**}\ln(Pfi/Pdi) + \underset{(6.784)}{9.849}^{**}\ln(Qw) + \underset{(5.039)}{1.152}^{**} D8889 \quad (19)$$

$R^2 = .944$ DW = 1.98 S = 0.286

F = foreign capital inflows
Rd = interest rate on commercial bank credits
Rf = foreign interest rate (Eurodollar rate)
e = effective exchange rate index
Pfi = export price index of industrial countries
Pdi = domestic price index of industrial products
Qw = industrial production index for 19 industrial countries
D8889 = dummy variable (1 for 1988 and 1989, otherwise 0)

Private Portfolio:

$$Z/Y*Pd = -0.022 + \underset{(4.658)}{0.008}^{**} Rz - \underset{(4.457)}{0.248}^{**} Ln(Pd/Pd(-1)) + \underset{(45.795)}{0.976}^{**} LHSV(-1) \quad (20)$$

$R^2 = 0.993$ DW = 1.94 S = 0.012

Z = interest-yeild financial assets in private sector
Y = gross domestic products (real)
Pd = GDP deflator
Rz = interest rate on interest-yeild financial assets in private sector

(21) $DD/Y*Pd = 0.023 - 0.001^{*}\ Rz - 0.027\ Ln(Pd/Pd(-1)) + 0.723^{**}\ LHSV(-1)$
(2.759) (2.038) (5.573)

$R^2 = 0.848$ DW = 2.49 S = 0.003

DD = demand deposits
Y = gross domestic products (real)
Pd = GDP deflator
Rz = interest rate on interest-yeild financial assets in private sector

(22) $TD/Z = 0.145 + 0.022^{**}\ Rt - 0.029^{**}\ Rs + 0.003\ Rg + 0.762^{**}\ LHSV(-1)$
(3.138) (5.812) (0.655) (13.774)

$R^2 = 0.972$ DW = 1.87 S = 0.014

TD = time deposits
Z = interest-yeild financial assets in private sector
Rt = interest rate of time deposits
Rs = interest rate of saving deposits
Rg = interest rate of government bonds

(23) $SD/Z = 0.086 - 0.019^{*}\ Rt + 0.025^{**}\ Rs - 0.003\ Rg + 0.813^{**}\ LHSV(-1)$
(2.804) (4.771) (0.883) (13.238)

$R^2 = 0.973$ DW = 1.89 S = 0.014

SD = saving deposits
Z = interest-yeild financial assets in private sector
Rt = interest rate on time deposits
Rs = interest rate on saving deposits
Rg = interest rate on government bonds

Bank Portfolio:

$$(24)\quad Ln(Fl) = 2.421 - \underset{(6.283)}{2.186^{**}}\, Ln(D) + \underset{(8.091)}{2.803^{**}}\, Ln(L) - \underset{(2.565)}{0.263^{*}}\, Ln(Rf) + \underset{(4.157)}{0.416^{**}}\, Ln(Rdis)$$

$R^2 = 0.974 \qquad DW = 1.17 \qquad S = 0.129$

Fl = foreign liabilities
D = total deposits
L = commercial bank credits
Rf = foreign interest rate (Eurodollar rate)
Rdis = discount rate

$$(25)\quad L = -37619.4 + \underset{(83.00)}{0.820^{**}}\, D + \underset{(1.208)}{1899.1^{*}}\, Rd + \underset{(13.884)}{1.395^{**}}\, Fl$$

$R^2 = 0.998 \qquad DW = 0.82 \qquad S = 12110$

L = commercial bank credits
D = total deposits
Rd = interest rate on commercial bank credits
Fl = foreign liabilities of commercial banks

$$(26)\quad GBb = 11268.6 + \underset{(34.981)}{0.131^{**}}\, D - \underset{(0.443)}{297.49}\, Rd$$

$R^2 = 0.965 \qquad DW = 1.03 \qquad S = 7556$

GBb = government bonds held by commercial banks
D = total deposits
Rd = interest rate on commercial bank credits

(27) $Fa = 8034.9 + 0.054^{**} D + 1270.6\ (Ru-Rd)$
$\qquad\qquad\qquad\quad (20.450) \qquad (1.783)$

$R^2 = 0.957 \qquad DW = 1.73 \qquad S = 3684$

Fa = foreign assets
D = total deposits
Ru = interest rate on US's government bonds (mid-term)
Rd = interest rate on commercial bank credits

(28) $CAb = 3000.3 + 0.030^{**} D$
$\qquad\qquad\qquad\quad (30.394)$

$R^2 = 0.977 \qquad DW = 2.02 \qquad S = 1412$

CAb = cash and claim on BOT by commercial banks
D = total deposits

Identities:

(29) $B = Hb + Hg + Hf + Ho$

B = monetary base
Hb = claims on commercial banks by BOT
Hg = claims on government by BOT
Hf = net foreign assets of BOT
Ho = other sources of base

(30) $D = DD + TD + SD$

D = total deposits
DD = demand deposits
TD = time deposits
SD = saving deposits

(31) $CAp = B - CAb - OB$

CAp = notes in circulation
B = monetary base
CAb = cash and claim on BOT by commercial banks
OB = other uses of base

(32) GBp = Z - TD - SD

GBp = government bonds held by private sector
Z = interest-yeild financial assets in private sector
TD = time deposits
SD = saving deposits

(33) Hb = L + GBb + Fa + CAb - D - Fl - OL

Hb = claims on commercial banks by BOT
L = commercial bank credits
GBb = government bonds held by commercial banks
Fa = foreign assets
CAb = cash and claim on BOT by commercial banks
D = total deposits
Fl = foreign liabilities
OL = other liabilitites of commercial banks

(34) X = Xa + Xi

X = aggregate merchandise exports (real)
Xa = export values of agricultural products (real)
Xi = export values of industrial products (real)

(35) XN = (Xa*Pxa) + (Xi*Pxi)

XN = aggregrate merchandise exports
Xa = export values of agricultural products (real)
Xi = export values of industrial products (real)
Pxa = export price index of agricultural products
Pxi = export price index of industrial products

(36) M = Ma + Mi + Mo

M = aggregate merchandise imports (real)
Ma = import values of agricultural products (real)
Mi = import values of industrial products (real)
Mo = import values of petroleum products (real)

(37) MN = (Ma*Pma) + (Mi*Pmi) + (Mo*Pmo)

MN = aggregate merchandise imports
Ma = import values of agricultural products (real)
Mi = import values of industrial products (real)
Mo = import values of petroleum products (real)
Pma = import price index of agricultural products
Pmi = import price index of industrial products
Pmo = import price index of petroleum products

(38) TBD = MN - XN + OTBD

TBD = Trade deficits
MN = aggregate merchandise imports
MX = aggregate merchandise exports
OTBD = other items not included

(39) CAD = TBD + Ms - Xs - Tr

CAD = current account deficits
TBD = trade deficits
Xs = non-merchandised exports
Ms = non-merchandised imports
Tr = unrequited transfer from abroad

(40) Hf = CAD + F + OHf + Hf(-1)

Hf = net foreign assets of BOT
CAD = current account deficits
F = foreign capital inflows
OHf = net errors and ommisions

(41) A = Cp + Ip + (Cg/Pd) + (Ig/Pd)

A = domestic absorption
Cp = private consumption expenditures (real)
Ip = private capital formation expenditures (real)
Cg = public consumption expenditures
Ig = public capital formation
Pd = GDP deflator

(42) Y = A + X + (Xs/Pxs) - M - (Ms/Pms) + Dis

Y = gross domestic products (real)
A = domestic absorption
X = aggregate merchandise exports (real)
Xs = non-merchandised exports (real)
Pxs = export price index of other exports
M = aggregate merchandise imports (real)
Ms = non-merchandised imports (real)
Pms = import price index of other imports
Dis = discrepancies in national income identity (real)

(43) E = [A+(XN/Pd)] - [Qa+Qi+Qp]

E = demand pressure variable
A = domestic absorption
XN = aggregrate merchandise exports
Pd = GDP deflator
Qa = value added of agricultural products
Qi = value added of industrial products
Qp = value added of public utilities

(44) Dg = Cg + Ig - T

Dg = government budget deficits
Cg = public consumption expenditures
Ig = public capital formation
T = government tax revenues

(45) Bf = Dg - (GBp-GBp(-1)) - (GBb-GBb(-1)) - (Hg-Hg(-1)) - GSB - OG + Bf(-1)

Bf = stock of government's external debt
Dg = government deficits
GBp = government bonds held by private sector
GBb = government bonds held by commercial banks
Hg = claims on government by BOT
GSB = Government's borrowing from Government Savings Bank
OG = other financing of government deficits

(46) M1 = CAp + DD

M1 = money supply (narrow definition)
CAp = notes in circulation
DD = demand deposits

(47) Pdh = exp[{ln(Pd)-0.2321*ln(Pda)-0.2989*ln(Pdi)}/(1-0.2321-0.2989)]

Pdh = domestic price index of public utilities and services
Pd = GDP deflator
Pda = domestic price index of agricultural products
Pdi = domestic price index of industrial products

Notes:

* indicates .05 significant level.
** indicates .01 significant level.
*** Durbin-h cannot be found but coefficient of e_{t-1} is not significant.

LHSV(-1) is lag of left-hand-side variable
S is a standard error of the regression.
DW is Durbin-Watson statistic.
Dh is Durbin-h statistic.
R^2 is adjusted R^2.

The figures in parentheses below the coefficients are absolute t values.

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